

## **Modeling and optimization of lipase-catalyzed partial hydrolysis for diacylglycerol production in packed bed reactor**

### **ABSTRACT**

Response surface methodology (RSM) was employed to optimize the process variables namely packed bed height (cm) and flow rates (ml/min) on diacylglycerol (DAG) production *via* partial hydrolysis of palm oil using immobilized *Rhizomucor miehei* lipase in packed bed reactor (PBR). Quadratic models were successfully developed for both DAG<sub>(y)</sub> and unhydrolyzed triacylglycerol ((<sub>un</sub>)TAG) with determination coefficient ( $R^2$ ) of 0.9931 and 0.9986, respectively coupled with insignificant lack of fit ( $p > 0.05$ ). Optimal conditions for DAG synthesis were evaluated to be 10 cm packed bed height and 3.8 ml/min flow rate. Immobilized enzyme can be reused up to 10 times without significant changes in enzymatic activity. The partial hydrolysis under studied was found to be mass transfer-controlled.

**Keyword:** Diacylglycerol; Packed bed reactor; Palm oil; Partial hydrolysis; Response surface methodology